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THE ROLE OF METEOROLOGICAL SERVICES IN CANADA'S NORTH

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THE ROLE OF METEOROLOGICAL SERVICES IN CANADA'S NORTH

The scientists, explorers, missionaries, adventurers and traders who first ventured into the forbidding terrain and ice-choked waters of Canada's northland were seeking the attainment of goals as diverse as those which challenge modern man. A listing of these pioneers would include many whose aim was to scientifically record, study and transmit the weather conditions. And what weather! Temperatures which routinely plunged to 60 below in the interior valleys of the Yukon; summertime mists and fogs which covered the Arctic headlands and inlets; howling gale-force winds which poured off the glaciers and snow-capped peaks of Baffin and Ellesmere Islands.

Although weather readings were taken by the explorers and scientific expeditions of the 19th century, the systematic and regular reporting of weather dates from the 1920's when radio stations established along the Mackenzie River reached as far as the delta; at the same time, similar facilities set up in the Hudson Straits, serving the Hudson Bay sea route, initiated weather observations. In the 1930's weather reporting stations were opened on the mainland coast of the Arctic Ocean and on Baffin Island. As the reports from these locations were compiled and analysed, knowledge of the climatology of this vast, important, and unique area began to emerge.

The Canadian Meteorological Service, during the war years, realized the importance and, indeed, the necessity of having regular surface and upper-air weather observations from the high Arctic. In 1947, in concert with the U.S. Weather Bureau, the Joint Arctic Weather Stations (JAWS) were established. For over twenty years these northern outposts have year-in and year-out provided the reading on which much of our forecasting and knowledge of Arctic weather is based. During this score of years the essential job of





resupplying these stations with men and material, by air and by sea, plus maintaining the essential communication links, has been carried out with dispatch and efficiency. It forms an achievement to which the Ministry of Transport can point with pride.

The Canadian people, and especially the scientific community, owes much to JAWS and other northern weather observing stations. In addition to the regular program of meteorological readings, they have served, as a network, to sense, measure, monitor and record many geophysical elements of importance to our earthly environment. A brief summary of this would include readings of the visual aurora, evaporation, ice thickness, noctilucent cloud, ozone, radiation, seismic phenomena, soil temperatures, duration of sunshine, and many more.

In 1950 a small group of meteorologists within the Edmonton Forecast Office established the Arctic Forecast Team. Its role was important; its task difficult. It was charged with the responsibility of providing aviation forecasts for almost the entire Arctic. Aircraft operators who were providing, then as now, the main means of transportation between southern Canada and the northland needed this information for flight planning and conducting their flying operations with due regard for safety. The great distances involved, the lack of alternate airstrips, not to mention the fierce winter storms made it essential that weather factors be given a high priority. By making maximum use of sparse data and developing analysis techniques, but mostly by studying the weather patterns and behaviour of air masses over the north, the Arctic Forecast Team was able to provide the forecasts required and transmit them by radio-teletype and facsimile transmission to the northern terminals. Today,





the Arctic Weather Central in Edmonton, the lineal descendant of the Arctic Forecast Team carries on this task; the expertise and knowledge of its staff supplemented by computer-produced prognostic charts which use as input the routine daily observations taken by the dedicated men who staff these lonely stations at the top of the world.

But these things change - even in the Arctic. To replace the Nottingham Island weather reporting station operated by the Ministry's Telecommunications Branch for many years; a contract Weather Observing Station was opened in early September of this year at Cape Dorset, Baffin Island. The observing staff consists of three Eskimo observers, employed by the West Baffin Cooperative Limited (the contractor) and trained by the Ministry's Quebec Regional Meteorological Instructor.

As other communities and establishments are opened in the Arctic, more weather observations filling in the blank spaces in the weather map can be expected. This will be to the benefit of all. One such arrangement that has operated for many years is the weather observing program at the DEWLINE stations. International Telephone and Telegraph Arctic Inc. (ITTA) personnel who man these stations are trained at Streator, Illinois, by U.S. Weather Bureau and Canadian Meteorological Service instructors. Regular inspections of the weather programs and instrumentation at these stations are made by CMS inspectors.

The heightened interest in the North and its economic potential is increasing the number of questions which are asked pertaining to the Arctic environment. Within the data banks at the Canadian Meteorological Service Headquarters in Toronto, climatological information is stored and can be made available to provide many of the answers. In addition to routine statistical information,





specialized research programs in support of northern airport development, oil exploration, conservation, and other endeavours, are being conducted.

The Canadian Meteorological Service has, since 1957, been charged with the responsibility of providing ice information in support of shipping in the straits and other water areas adjacent to the Arctic islands. Last year, for example, close to 1000 reconnaissance flights were carried out using specially modified and equipped DC-4 aircraft. The information gathered by such surveillance was fed directly to icebreakers via facsimile transmission and by means of special ice messages to the Ministry's Ice Central in Halifax. Specially trained ice observers aboard the Ministry's icebreakers reported on ice conditions as do shore-based observers at sites having significant sea exposures. The Ice Central is the only office in North America engaged in a year-round provision of current information on ice conditions in those continental and adjacent waters that are being used for marine operations. The forecasts of ice conditions and other advisory services are expected to be increased in scope and extent in the years ahead to meet the need for more specialized ice data. This will require more detailed observations of ice growth and movement, more research into the properties of sea ice, and more extensive archiving and statistical analysis of the ice data which is now being collected and compiled.

Northern economic development is more dependent on weather factors than is similar development at more southerly latitudes. The planning of communities and facilities in the north must take account of the fact that different design criteria for engineering projects, building construction and transportation systems prevail than for similar undertakings in more temperate climatic regions. To these problems can be added the ecological factors, being mindful of the delicate

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balance that has been achieved over the centuries between the harsh climate and the natural cover of the land surface. The Canadian Meteorological Service is an "old-timer" in the north. As other tenants move in, extensive use is being made, and will be made, of the network of stations, outposts and observing sites which now exist having as their primary reason for existence, the requirement for weather readings. Under the World Weather Watch program of the World Meteorological Organization, the earth's surface will be covered with a denser network of surface and upper-air stations. Not geography, but spacing, determines the location of observing sites. Canada with its large land mass has a special responsibility to provide the observations which will allow the analysis and prediction of weather to be done on a hemispheric and even global scale using the tremendous capabilities of modern computers and communication systems. Earth-circling satellites and other special sensing techniques may provide much of the data but, for the foreseeable future, the improvement of forecasts will depend, in large measure, on the regular observations taken at such important sites as Eureka and Alert.

Currently, the Canadian Meteorological Service operates 22 manned stations in the Northwest and Yukon territories. Weather observations are also taken on a regular basis at 16 Telecommunication Stations and 15 weather stations operating under contract arrangements. At Resolute, Frobisher Bay, Yellowknife and Whitehorse aviation briefing services are available from trained technicians and meteorologists. The Canadian Meteorological Service has contributed substantially to the past development of Canada's north; it hopes to play an equally important role in its future economic and social expansion.





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